Smarter Artificial Intelligence (AI) Technology and its Implications on Evaluating Human Behaviour

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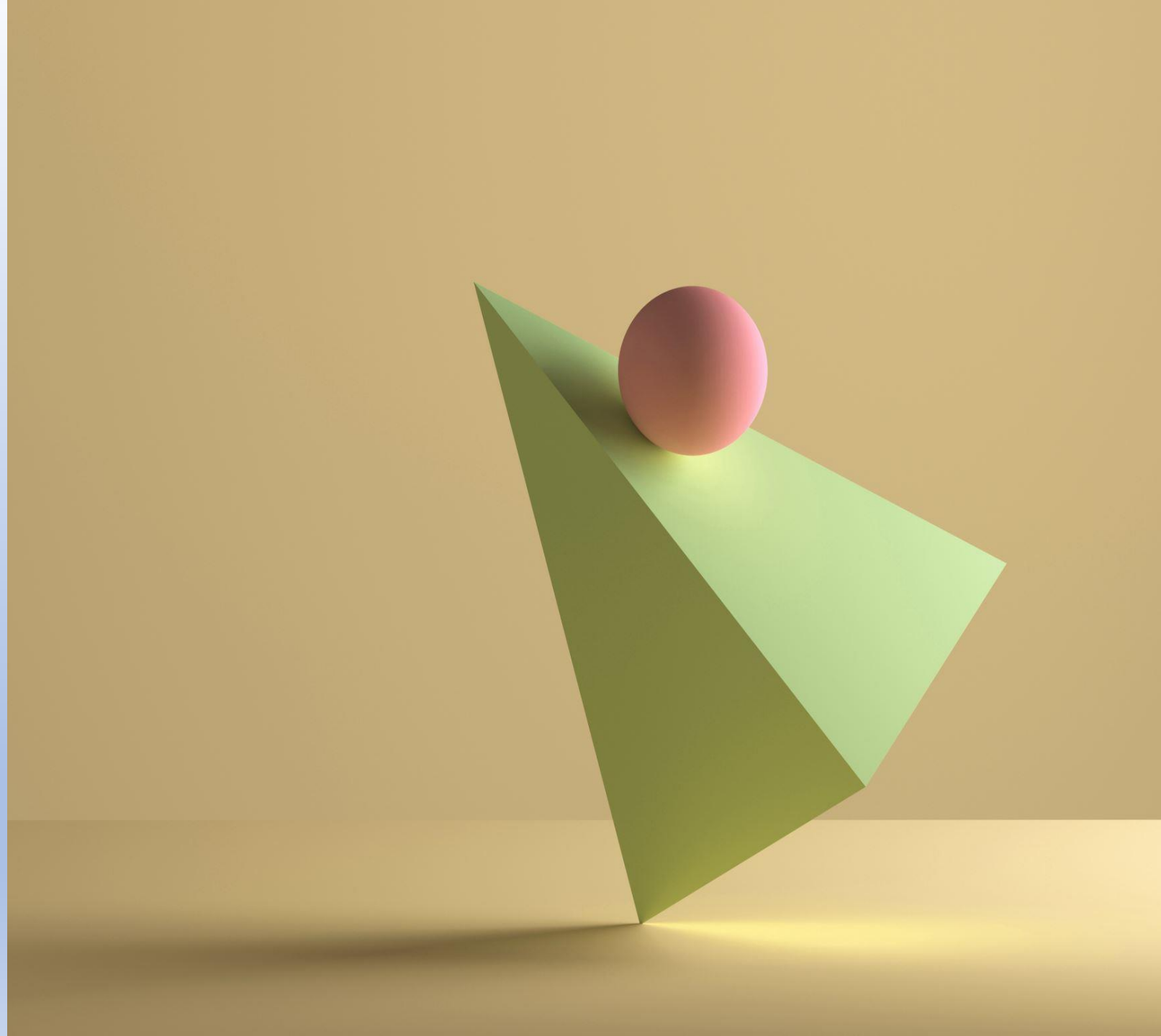
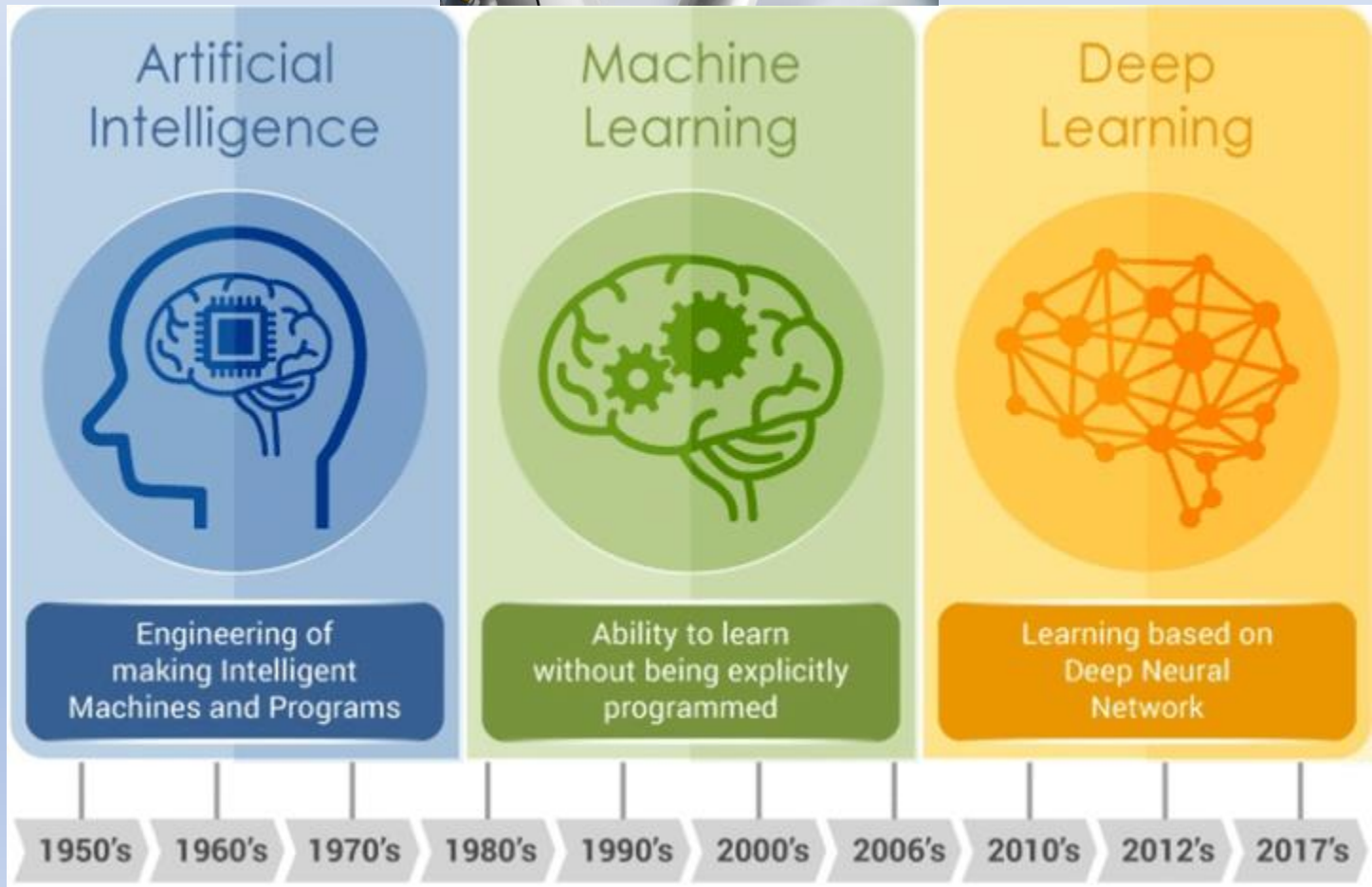


AI and machine learning (ML)

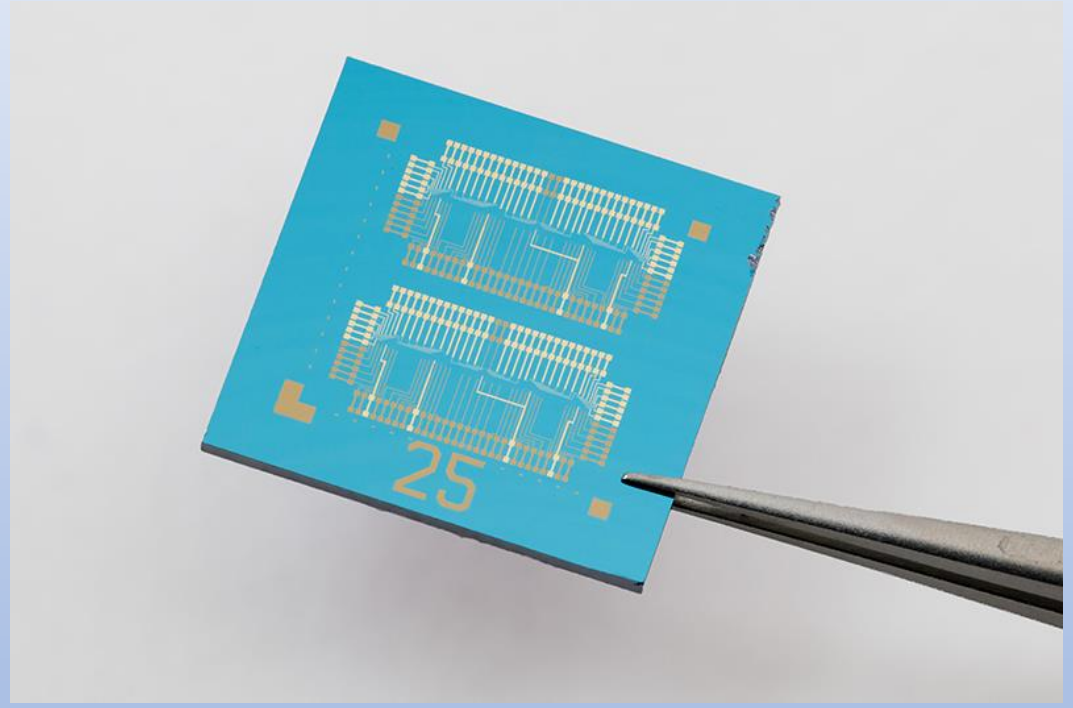
- Machine learning is a subset of artificial intelligence. ML requires a well-thought-out training and data acquisition strategy.

- AI, on the other hand, is an umbrella term for a broad set of computer engineering techniques, ranging from ML and rule-based systems to optimization techniques and natural language processing (NLP).



Logic-in-memory based on an atomically thin semiconductor

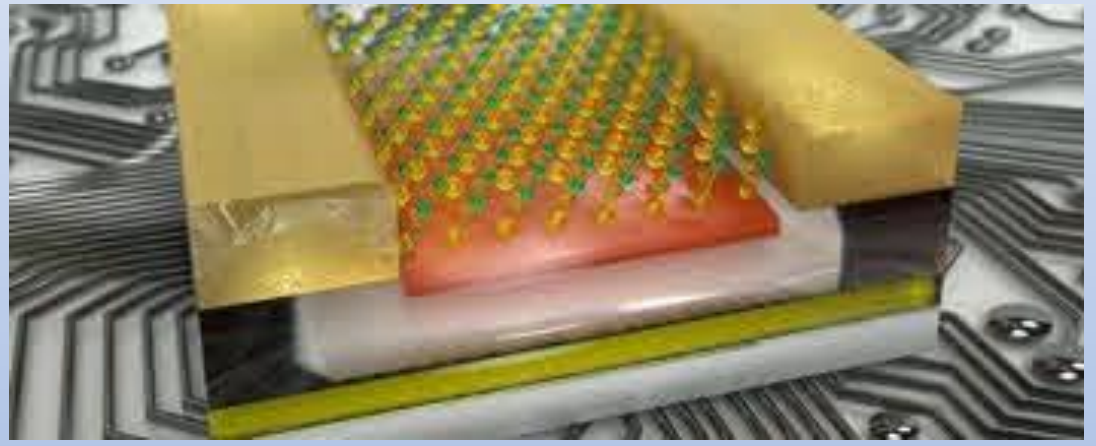
- Compared with **von Neumann architectures**, which have separate processing and storage units, **brain-inspired in-memory computing** uses the **same basic device structure for logic operations and data storage**, thus promising to reduce the energy cost of data-centred computing substantially.



Computer Chip- just three atoms thin layers

Migliato Marega, G., Zhao, Y., Avsar, A. *et al.* Logic-in-memory based on an atomically thin semiconductor. *Nature* **587,** 72–77 (2020). https://doi.org/10.1038/s41586-020-2861-0

- **These Layers Work Like The Neurons in Our Brains** –smaller, more powerful, more energy-efficient.
- It's a single architecture, where logic operations are combined with memory functions.
- It saves the time and energy needed to pass data between the processing and the storage stages.
- MoS_2 has proved to be an ideal material.

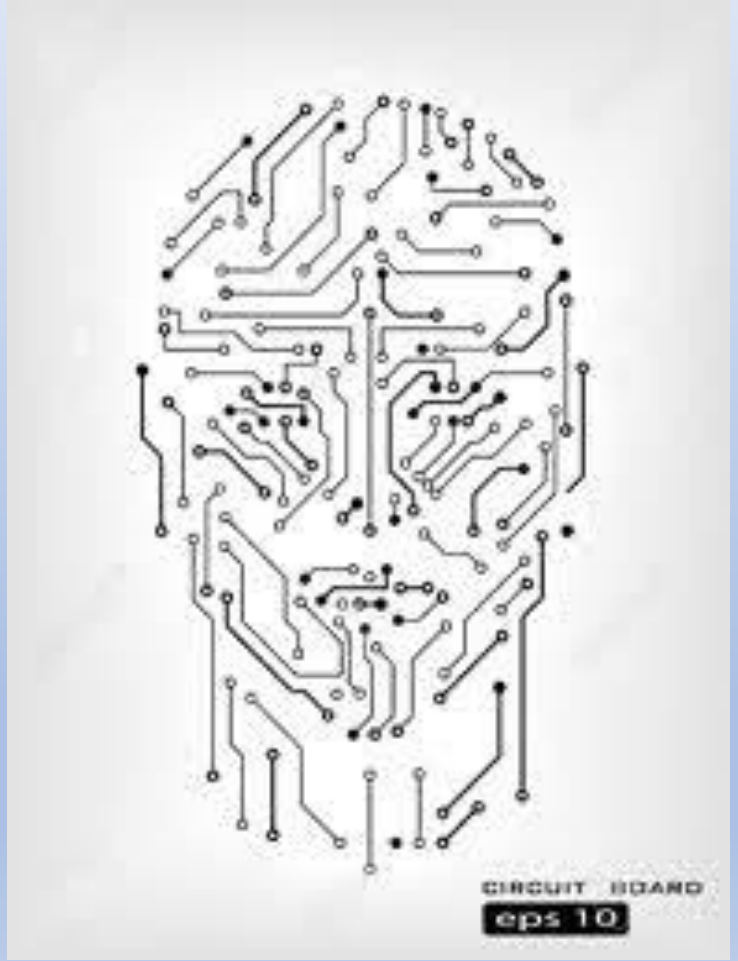


Circuit design advantages

- This ability for circuits to perform two functions is similar to how the human brain works, where neurons are involved in both storing memories and conducting mental calculations.

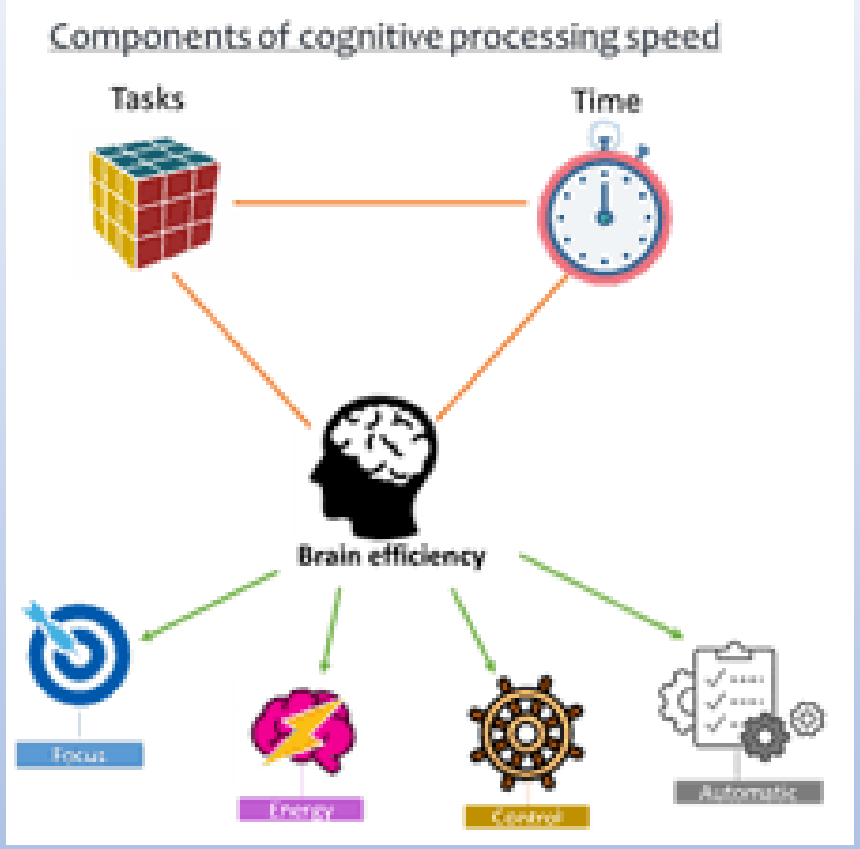
Advantages:

- It reduces the energy loss associated with transferring data between memory units and processors,
- cuts the amount of time needed for computing operations, and
- shrinks the amount of space required."



Applications

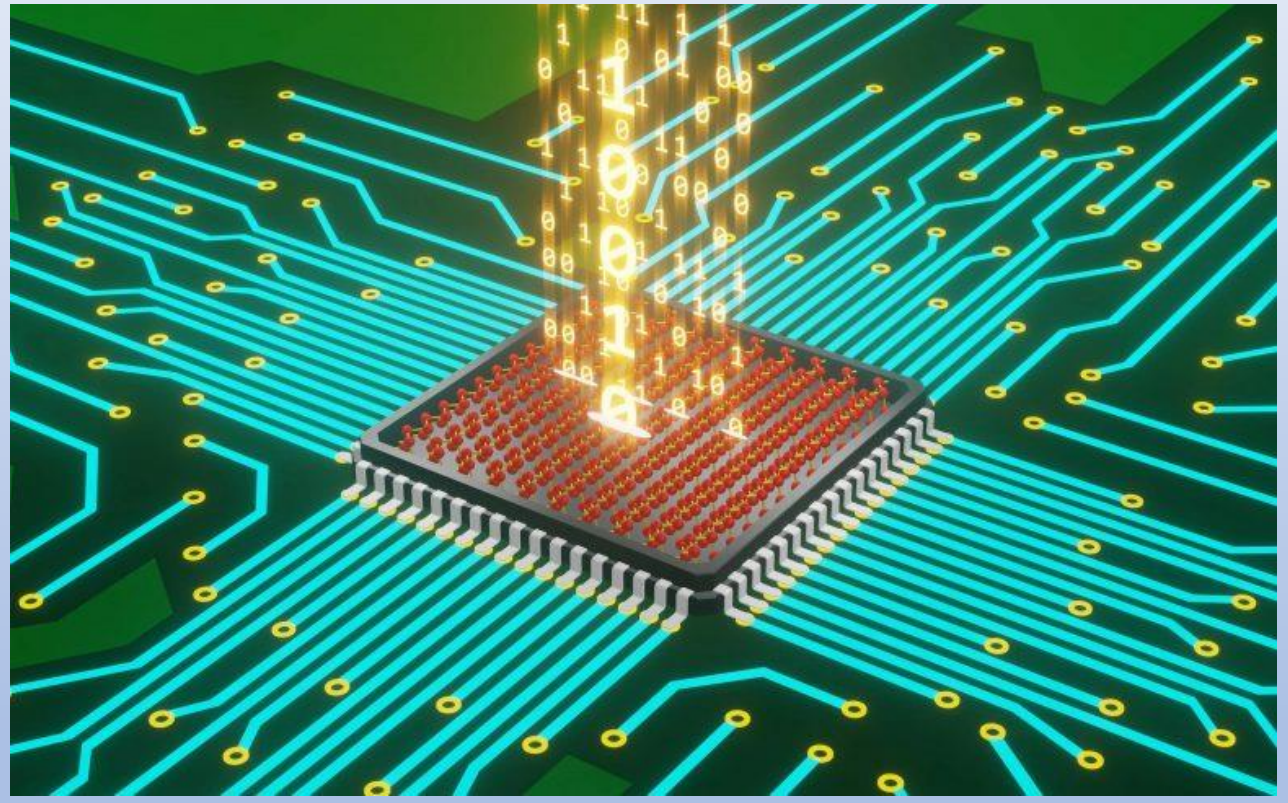
- self-driving cars
- smart speakers
- human brain neurons simulations
- increase processing speed,
- realisation of energy-efficient circuits based on 2D materials for machine learning,
- the Internet of Things and non-volatile computing,



New Light-Powered Chip

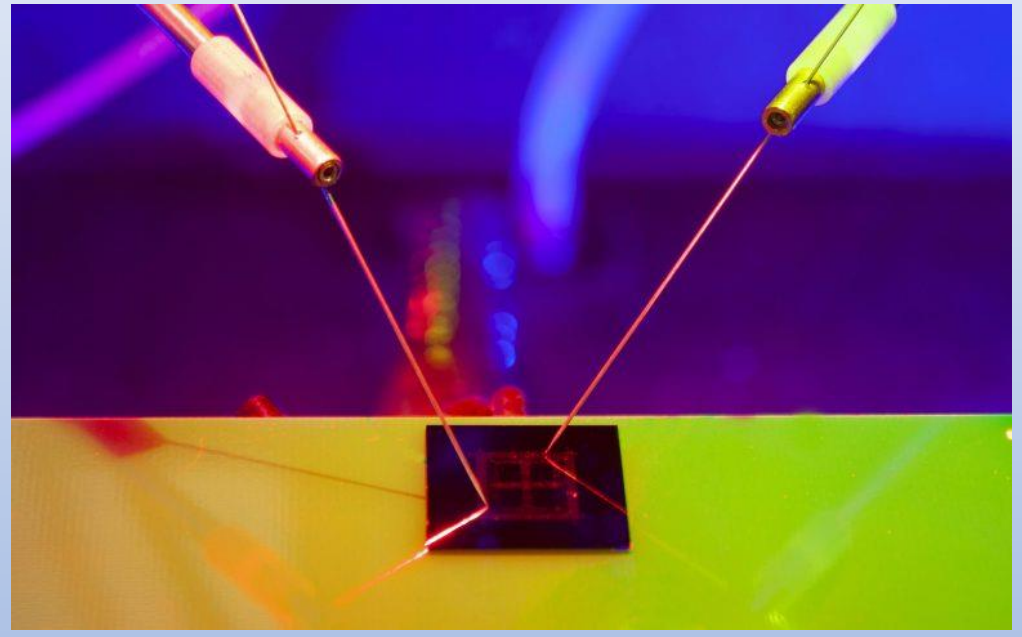
- The new prototype aims to integrate electronic hardware and intelligence together, for fast on-site decisions.

- *Researchers have developed artificial intelligence technology that **brings together imaging, processing, machine learning, and memory in one electronic chip**, powered by light.*



New Light-Powered Chip

- The prototype shrinks artificial intelligence technology by imitating the way that the human brain processes visual information.
- The nanoscale advance combines the core software needed to drive artificial intelligence with image-capturing hardware in a single electronic device.
- With further development, the light-driven prototype could enable smarter and smaller autonomous technologies like drones and robotics, plus smart wearables and bionic implants like artificial retinas.



Applications

- broaden the horizons for machine learning and AI to be integrated into smaller applications
- artificial retinas
- improve accuracy of the bionic eye
- a brain-on-a-chip that can learn from its environment just like we do

Furthermore:

- neuromorphic computation classify numbers and recognize images with an accuracy of over 90%.
- The devices provide a promising approach toward neurorobotics, human–machine interaction technologies, and scalable bionic systems with visual data storage/buffering and processing.

Technology Implications on Human Behaviour

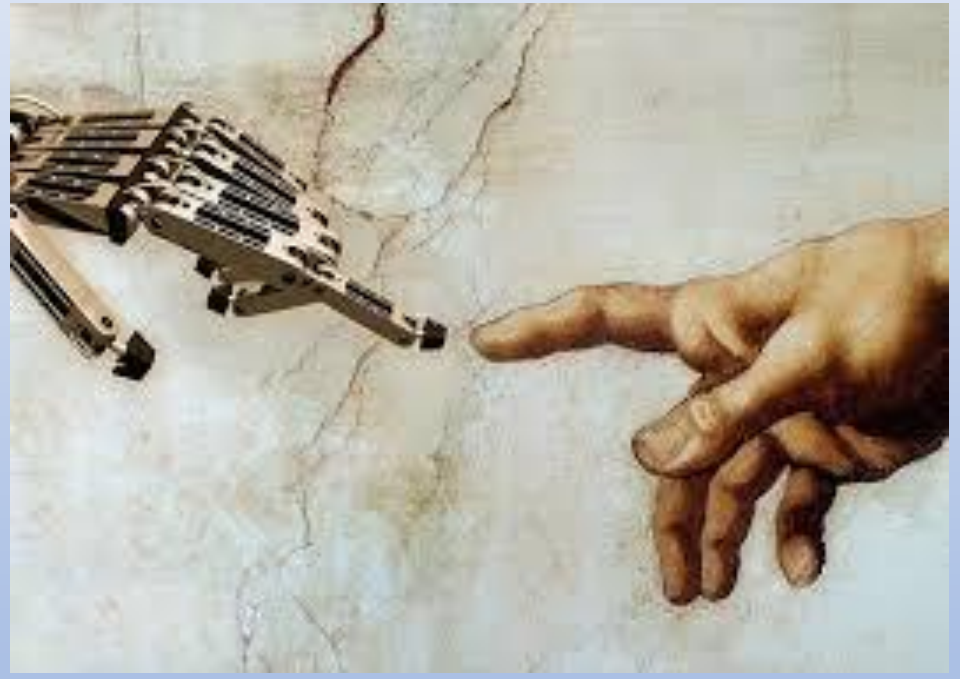
- Technology is not just changing the way people interact with the world, it's also changing the way scientists study human behavior and the brain.

- New technologies are allowing psychological scientists to take their research out of the lab and “into the wild,” where theories can be tested in real world settings.

- **Despite technology advancements having significant benefits for our lives, the often overlooked consequences are scary.**

Digital humanism

- **In a world of digital business, man and IT we will need to orchestrate all these new devices, new data streams and new experiences to create value.**
- **But what principles will we apply?**
- **We have to go back at the center of technological developments and making people the benchmark and rule for digitalization processes**
- **The emerging digital world requires human-centric digital leadership.**



Therefore, Digital humanism is about shifting from computer-centered to people-centered technology